

REMARKS

Claims 1-30 are of record.

The Office action is responded to using the corresponding paragraph numbers.

2. Claim 19 has been amended to correct the typographical error.

3. Claims 14-20, 22 and 24-30 have been amended to remove the objectionable term "thin".

All of the amendments made to the claims are made for the purpose of more clearly indicating the distinctive features of the invention and do not limit the claims from the original form for the purpose of distinguishing over the prior art.

New claims 31 and 32 have been added. Support for these claims is found in the original Specification, page 23, line 4, which recites that "the width of the narrow trench 1-3 is 300 μm or less". New claim 33 has been added to further define the invention.

4.-6. claims 1-2, 5, 7, 14, 16 and 18 are rejected under 35 U.S.C. §102(b) as being anticipated by Gipson, U.S. 4,732,446.

Regarding independent claims 1 and 7, the Examiner takes the position that in the structure disclosed by Gipson, the chip carrier 12 is inserted in a square hole 14, and electrical conductor tracks 52 are provided in a direction perpendicular to the optical pathways 48 (see Fig. 2) through optical fibers. The Examiner also states that Gipson teaches "a trench 14". However, in the structure of Gipson, reference numeral 14 indicates a square hole 14, as explained above. That is, the hole 14 is too wide to be called "a trench". Additionally, such a hole clearly differs from a "linear trench" as set forth in each of claims 1 and 7 in which light emitted from one of the divided portions of each of the optical fibers goes straight through the device in the trench and is incident on the other of the divided portions.

In the structure of Gipson, light emitted from one of the divided portions of each of the optical fibers enters the beam splitter 32, and a portion of the light is deflected toward a photo transistor die 44 where the light signals are converted into electrical signals. The electrical signals are conducted by wire connections to an integrated circuit die 40. The same electrically transmitted

8. Regarding claim 5, this claim also depends from claim 1 and sets forth the material in the trench. In view of the allowability of claim 1, claim 5 also should be allowable.

9. Regarding the rejection of independent claim 14 over Gipson, the hole 14 in the structure of Gipson clearly differs from the linear trench of the invention set forth in claim 14, as explained above. Also in the structure of Gipson, the chip carrier 12 comprises a clear plastic body providing a clear plastic window side wall 30, and the top and bottom substrates 38 are also provided (column 6, lines 49-52). The photo transistor dies 44 and the photo transmitter dies 46 are attached on the bottom substrate 38 (i.e., the bottom substrate may be a support member), and not only the bottom substrate 38, but also the top substrate 38 and the side wall 30 are present in the hole 14.

In contrast, in the invention as set forth in claim 14, the support member is attached to a portion of the surface-normal active optical device to support the surface-normal active optical device so that it is present when inserting the surface-normal active optical device into the trench. Also, the portion of the surface-normal active optical device that is not inserted into the trench and the surface-normal active optical device is supported by the support member on the substrate. By using this support member, even a very thin device surface-normal active optical device can be reliably inserted into the trench and electrodes can be easily extended from the device via the support member. Such a support member clearly differs from the bottom substrate 38 of Gipson on which the photo transistor dies 44 and the photo transmitter dies 46 are attached.

Therefore, claim 14, which defines a novel and advantageous structure, is also patentable and should be allowed.

10.-11. Claim 16 depends from claim 14 and claim 18 depends from claim 16. Each of claims 16 and 18 set forth further features of the invention that additionally defines patentable novelty. Therefore, claims 16 and 18 should be allowable.

12.-17. Claim 8 is rejected under 35 U.S.C. §103(a) as being unpatentable over Gipson in view of Wojnarowski, U.S. 5,562,836. Claim 8 depends from claim 7 and further recites that the electrodes are formed by sputtering or vapor deposition.

The combination of Wojnarowski with Gipson does not meet the basic device as set forth in the base claim 7. Further, in Fig. 19A of Wojnarowski, layer 226 of reflective material is applied to surfaces of a hollow microchannel or tunnel 222. Layer 226 may comprise titanium, gold, or other appropriate metal, including sublayers for the desired light transfer. That is, although the metal layer 226 may be deposited by vapor deposition or sputtering, the layer 226 is not an electrode but a reflection device.

In contrast, in the invention of claim 8 the electrode is formed by sputtering or vapor deposition only from the surface of the substrate at both sides of the trench to wall surfaces of the trench. Therefore, no electrode is formed on the bottom of the trench. This prevents a short circuit. In other words, such a form of the electrode can only be realized by employing sputtering or vapor deposition. This method would not have been obvious in making the device of claim 7, from which claim 8 depends.

18.22. Claim 19 is rejected over the combination of Gipson in view of Kruer, U.S. 4,117,329. Claim 19 depends from claim 14 and further recites that the surface-normal optical device is made of a particular type of glass. The Kruer patent is cited for its teaching of a glass substrate. The basic structure set forth in independent claim 19 is not met by the basic reference to Gipson, as discussed above. The addition on Kruer does not overcome this basic defect. Therefore, the novel subject matter of claim 19 is not taught or suggested by this combination of references and claim 19 should be allowed.

23.-27. Claim 23 is rejected over the combination of Gipson in view of Abe, U.S. 5,757,993. Claim 23 depends from claim 22, which in turn depends from independent claim 14. Claim 22 has been indicated to contain allowable subject matter (see Paragraph 29. of the Office Action). Therefore, claim 23 also should be allowable. In any event, the basic structure set forth in the base independent claim 14 is not met by the basic reference to Gipson, as discussed above. The addition of Abe does not overcome this basic defect. Since the novel subject matter of claim 23 is not taught or suggested by this combination of references, claim 23 should be allowed.

28. The allowability of claims 24-30 upon being amendeded to correct informalities is noted. These claims should now be allowable in view of the formal amendments that have been made.

29. The allowability of the subject matter of claims 3-4, 6, 9-13, 15, 17 and 22 is noted. These claims should still be allowable.

Accordingly, claim 8 further patentably defines over the rejection and should be allowed.

The other art cited has been considered and is not deemed pertinent.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Prompt and favorable action is requested.

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